

## **EXHIBIT QQ**



**Ski-Doo MX-Z 440**

## The Benchmark Scribes Deeper For 2005



**N**o debating this point. The 440 MX-Z REV has been the sled to beat in North American success since it hit the ground as a limited build in 2003. While recent history always seems more impressive than ancient history, keep this reality in mind: The REV 440 platform will have to stay at the top for a few more years to displace the records of the Polaris 110 Indy and XG of the late '80s and early '90s and the amazing dominance of Arctic Cat's ZRs from 1993 to the new millennium.

At this point in history, the REV has not only dominated but has definitely changed the rules. The introduction of the REV's radical centralized mass, rider-forward ergonomics changed the sport of snowsports and substantially altered the way pilots ride forever.

So definitive were improvements in lap times we were told the Blair-Mietter himself shaved off more than a second a lap when he piloted early hand-built versions of the racing REV platform.

The 2005 440 does not present myriad changes to even the trained eye. However, this statement alone is proof positive the Valcourt brain trust has had things fundamentally correct since day one.

If you speak with racers familiar with both '03

and '04 REV's you'll find they preferred

the '03 over the '04. Why? Reliability and tuning glitches. Essentially Ski-Doo made three subtle changes in '04 which created a cascading string of challenges. The most significant change was the move from a 1.625 inch lug track to a deeper 1.75 inch lugger with harder diameter rubber paddles.

This change made the paddles shovel harder without flexing and absorbing shock from power-on landings. This extra force was so significant it caused drive chains to stretch, snap and then the complete chain case could "implode" as the jackshaft bearing migrated toward the bottom of the case. Ski-Doo eventually released an updated and stronger case and a 17 link top from 151 drive chain. This cured the case

explosions but chain stretch was still present.

Another change in '04 was the move to TEAM Industries' Rapid Reaction secondary. Yes, it did indeed react rapidly but more than a few racers would have killed last year for the former Bombardier 4-roller racing secondary they knew and loved. The TEAM pulley was not a bad design - in fact it's still used by all three snowmobile OEMs on their 440s. The issue was understanding and appreciating the pulley's ability to sense and react to power and racing surface changes.

The third change was the move to involute/conolute drivers last year. These aggressive sprockets are designed to eliminate (and they do!) track ratcheting. However, they almost immediately spun on the axle - another indication something was enduring gargantuan stress with the 1.75 inch track. A harder sprocket material combined with a wider pinch band

cured the axle spin but weird wear problems plagued these sprockets as a result of a track with clips on only every other window.

That's all history. In 2005, the track is still a 1.75 inch lug unit but it now has a softer durometer rubber in the lugs which 1) keeps them from splinting off the carcass and 2) they now absorb some shock on power-on landings. Clips are now on every window. This effectively spreads drive loads over

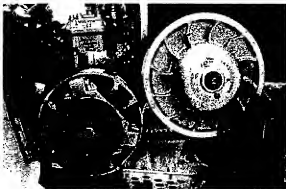
more sprocket lugs and cones weird wear patterns experienced last season.

The '05 chamaine is the improved and heavily webbed version from last year. The big news is the move back to a 15 wide chain (which fits much better in the case as a result of an innova-



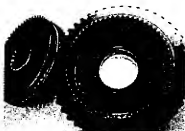
**ABOVE:** This billet aluminum cam produces accelerated front shock movement - not seen on past SD SC series suspensions.

**LEFT:** The new SC-4 skid only couples rear-to-front but offers four different coupling moments provided by the rotating coupler block. The new skid is lighter and features a "pass-thru" upper front swing-arm design.



The 440's pipe, ECU and Hot Button system have all been updated for '05. Racing TRA is bulletproof and easily tuned with RPM "clickers".

rive clutch/bottom gear combination developed by TEAM Industries for Ski-Doo. This is one of the coolest pieces of tech we've seen in some time. Essentially the middle of the gear is a motorcycle type multi-plate clutch pack. The pack is said to be calibrated to slip incrementally when loads exceed 1000 foot pounds. Ski-Doo Race Department officials claim spike loads approaching 1500 foot pounds are achievable with Open Mods on power-on landings in packed, heavy snow. At this torque level, chains



This TEAM Industries "Slipper" bottom drive gear is a breakthrough for snowcross sleds, virtually eliminating chain stretch, breakage and case explosions. Cool.

even 17 wide - will stretch and the case is taken to its limits. Essentially, Ski-Doo exceeded the outer edge of the traction/power/durability equation with a 1.75 inch lug track. This new clutch/gear set-up protects the snowmobile from itself and from what we've heard this fall, this is not just a good idea, it's a 100 percent fix.

TEAM Industries' Rapid Reaction secondary shows up again this year with subtle but effective calibration tweaks. However, the real fix for last year's clutching inconsistencies relates more to the improved and hotter exhaust pipe design and a freshly programmed ECU and "Hot Button".

What's a hot button? 2-stroke engines make more power if their exhaust pipes are hot and the engine is somewhat cooler. In snowcross racing you can't take a full pull down a lake before the green flag drops to heat up the pipe so a system has been developed to get the pipe red hot just before the driver leaves the line. Ski-Doo's system last year was effective at initially heating the pipe by retarding the timing when the button was depressed. This would "flood" the pipe with raw gas. This fuel would instantly ignite when the button was released. This flame thrower-type reaction in the pipe will boost holeshot performance dramatically. However, in last year's application, the pipe would cool somewhat after the first lap and the TEAM secondary would then attempt to react to the slight drop in horsepower. This would often cause things to go wacky - especially in heavy, loose snow or on race days with wild weather and temperature swings. This year a new pipe and map effectively eliminate these inconsis-

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**LEFT:** You'll find a new, tougher and stickier seat cover material on the '05 MX-Z. It's designed to help riders keep the sled squeezed between their knees and to resist tearing in first turn maneuvers.

power induced weight transfer (wheels).

SC-1 incorporates a "pass-through" upper front arm design pioneered by Arctic Cat. This allows the rail tips to swing past the front arm's tunnel mounts for extra travel at the collapsed end of the front shock's stroke.

This sled was tested in Ski-Doo's Factory Open Mods raced by Warner (Michael Island) and BMR (Blair Morgan and friends) last season. Initially the sled was not given universal approval by riders who complained it was too reactive. However, after calibration tweaks it was given the nod by virtually every pilot.

There can be little doubt the Ski-Doo MX-Z 440 will be a tough act to beat at all levels of snowcross competition. If you wanted a 2005 440 Ski-Doo and didn't receive one, there's hope. If you can find a good clean 2003 or an updated 2004 (the updates are not free as there's no warranty on race sleds) you'll have a sled that's only a hair's breadth off the

tencies and the 440 will now deliver even, strong squeeze throughout an entire heat or final.

The most noticeable change to the 2005 MX-Z 440 is the inclusion of the all-new, race developed SC-1 rear skid. This is the very first, purpose built, rider forward rear suspension in the biz. SC-1 couples only rear-to-front and replaces front-to-rear coupling with a mechanical accelerator cam on the front arm shock. This setup addresses rider forward weighting - the rider stands directly over the front arm rail snubbers on a REV - by prioritizing the front shock's involvement in bump absorption. Conversely, the rear arm now couples very late in the skid's movement cycle but can still be used to control weight transfer with a new 4-position control block. Open Mods benefit greatly as a result of this rear-to-front coupling by harnessing hose-

its in most areas except for the slick SC-1 skid.

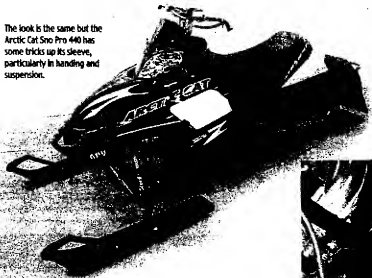
In the world of competitive snowcross, reliability is key. In racing, change is always risky. This year Ski-Doo worked hard to achieve improved reliability in a sled that's been the standard to beat for two seasons.

If their plan is successful, it may be another yellow year. ▲



These involute/convolute drivers deliver ratchet free, loose track power transmission but when combined with a 1.75 inch trench digger created nightmares last year. High and low speed compression adjuster is visible on front arm shock reservoir.

The look is the same but the Arctic Cat Sno Pro 440 has some tricks up its sleeve, particularly in handling and suspension.



## ARCTIC CAT 440 Sno Pro Details, Details, Details!

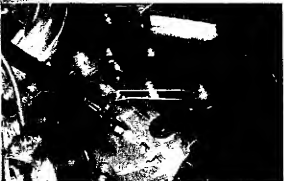
The era of the purpose-built snowcross racer is coming to a close. Before long, build quantities required by rule will define to the point where sleds the factories provide for racing will once again bear significant resemblance to the sleds you and I ride.

But that's the future. For now, all three players in the Pro Stock snowcross racing game are offering sleds they call "purpose-built," a term meant to define a factory built specialty sled designed and equipped to do only one thing: Win races. Each has an engine not used elsewhere in the line, each has a handling

and suspension package not available in other machines from the same brand and each displays a slew of features aimed at providing the razor-thin edge that separates the podium standers from the pack-up loaders.

Arctic Cat is in its fourth season with the F-Chassis Sno Pro race in US, adding the forward

**BELOW:** A totally new take on the forward steering post, the AC Progressive Steering System has a light touch at turn-in, ramping up effort as the skis approach maximum steering angle.



steering post last season and finally acquiescing to the small-car emboldened-rookie-eyes adopted by the competition. The O's deeper tunnel, flat footrests and steeper, decambered spindles were other details that kept Cat in the hunt and (mostly) on the podium, but the F-Cat



The big change in the wishbones is the addition of the infinitely adjustable Fox Float air spring shocks that shave five pounds and deliver smooth, progressive action.

has yet to post the kind of domination enjoyed by the ZR it replaced in 02.

The press brief says *all new*, but the F-chassis is back again for 03 with what really amounts to

another round of detail refinements, this time more centered on suspension and handling. Before you think we're offering faint praise, remember our oft-expressed respect for the Green and the many innovations AC has brought to the party over the years. In drivers of mass concern, for example, only the Arctic Cat Sno Pro goes to the track in 03 with a layback engine package. Cat was first with the roller secondary, driver-adjustable ignition, exhaust pipe sensor, hooked handlebars and many other current standards of snocross equipment.

This time around it's a surprising track suspension innovation Cat is calling the Slide Action front arm. Uncoupled from the rest, the skid features a new front arm mount that allows the pivot to move a half inch fore and aft. From here, this looks like a way to allow the track to shift torque forces slightly under hard acceleration in bumps. It's an almost invisible trick we missed when we eyeballed the sled the first time but, if it works, it might be the Next Big Thing in snocross corner prowess.

Remember that snocross in 2003 is essentially a low speed battle in bumps and corners. The doubles and triples are all but routine these days, leaving the races to be won in the hairpins and snitters. If you see some commonality in the direction the three sleds reported here are going, this is the reason.

The new front arm slider on the SnoPro is aimed



Up close, the spindle/saddle junction shows the spring-loaded saddle bolt that allows the front end to vary its stance to smooth out scrub and darting.

directly at that all-important cornering edge. But that assembly is not the only place a track suspension must work. The rear arm has also been massaged with a 7-step coupler said to allow very fine tuning of weight transfer when it counts—coming out of the corners. The hydraulically con-

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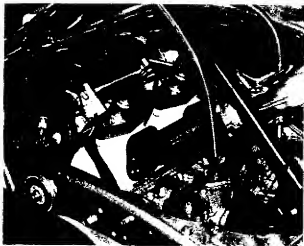
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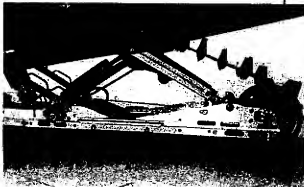
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**ABOVE:** Still the most high tech of the 440 engines, the layback Suzuki features a lighter crank for faster revs and the full complement of electronic engine controls.

**BELOW:** This track suspension view shows the 3-inch Attack 20 track and new axle design. Under the tunnel is a clever lateral slider for the front arm that may be 05's handling trick of the year.



nected Cross-Link track suspension returns in a skid fitted with a revised rear axle and beefed rail bracing.

Up front, the forward-of-engine steering has been improved with a progressive action that produces less steering effort at turn-in, ramping up as the skis move to max angle, itself up an additional 9.5 degrees for tighter cornering than ever. Springless compression and rebound adjustable Fox Floor AirShox suspend the largely unchanged wishbones.

Down at the bottom of the spindles is a side-to-side slider trick that permits a half-inch of side-to-side movement of the ski saddles in the spindles. Positioned with internal springs, the set-up allows the ski stance to vary from 42 to 43 inches as the front end cycles through the ruts. Said to have a very positive effect on scrub and during, early driver reports have been very positive. Again, if this works watch for it to spread quickly.

Power from the 440cc laydown engine will be quicker to rev thanks to a 1.5 lb lighter crank and the Sno-Pro gets a version of the Attack 20 track with three-inch lugs that's fully 5 lbs lighter than the track used last season. Other details include a new brake rotor, a wider one-inch chain (no ACT drive just yet) and the now universal gripper seat. Thanks to the lighter track and ski suspension, this fourth in a line of F-Cat racers might just be the lightest yet at a quoted 429 lbs. ▲